

THERMAL BARRIER COATING SYSTEM

Abstract

A TBC system suitable for protecting the surface of a substrate subjected to a hostile thermal environment. The TBC system comprises a bond coat on the substrate surface, an alumina scale on the bond coat, and a multilayer TBC comprising a thermal-sprayed first ceramic layer on the alumina scale and a thermal-sprayed second ceramic layer overlying the first ceramic layer. The first ceramic layer consists essentially of partially stabilized zirconia so as to comprise the tetragonal and cubic phases of zirconia. The second ceramic layer consists essentially of fully stabilized zirconia so as to consist essentially of the cubic phase of zirconia. The second ceramic layer is also characterized by having vertical microcracks that extend through the thickness thereof. The second ceramic layer is thicker and more erosion resistant than the first ceramic layer.